

Abstract

A substrate is polished and made an inclined substrate, which is exposed to a hydrogen plasma and is thereby smoothened. The 5 substrate is then heated controlledly until it surface temperature reaches 830°C. Meanwhile, a gas mixture of 1% methane, 50 ppm hydrogen sulfide and hydrogen is introduced in a tubular reaction vessel to flow therethrough at 200 ml/min, where microwave plasma is excited to cause n-type semiconductor diamond to epitaxially grow 10 on the substrate. An ion doped n-type semiconductor is thus formed that has a single donor level of an activation energy at 0.38 eV and is high in mobility and of high quality.